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2 SYSTEM AND METHOD FOR PROVIDING LINKS TO
3 AVAILABLE SERVICES OVER A NETWORK

4 The present invention generally relates to an improved system
5 and method for providing links to services available over a network. More
6 specifically, it relates to an improved system and method for providing links to
7 services available to an operably connected local computer over a network.

8 Since laptop computers are designed for traveling and generally
9 are not intended to rest in one particular location, users will often face a
10 situation in which they must utilize services on a connected network system
11 that have not been configured for use with their laptop computers. Typically,
12 users cannot utilize the services available on a given network environment
13 without prior configuration of these services on the laptop computer by a
14 network administer. However, this greatly limits the potential mobility and
15 flexibly of using a laptop computer and undesirably consumes valuable

1 memory. Consequently, it would be a great benefit if users could utilize
 2 services available to the laptop computer once connected to a given network
 3 environment, in which the laptop computer is configured to find services that
 4 may provide imaging data or make user of imaging data belonging to the user.
 5 It should be noted that the term "imaging data" as read herein refers any data
 6 format capable of being represented graphically, such as a Portable Document
 7 Format PDF file or a Joint Photographic Experts Group ("JPEG") file.

8 BRIEF SUMMARY OF THE INVENTION

9 The present invention is directed to an improved system and
 10 method for providing links to services available to an operably connected local
 11 computer. More particularly, the present invention relates to a system and
 12 method for providing links to services available to an operably connected local
 13 computer over a network.

14 The present invention provides a system that includes a thin
 15 portal service for finding services available to the local computer, a thin portal
 16 service web content created by the thin portal service for returning links to the
 17 discovered available services, and a web browser installed on the local
 18 computer for displaying the thin portal service content.

19 The present invention further provides a method that includes the
 20 steps of finding services available to the local computer, creating a thin portal
 21 service web content for returning links to the discovered available services, and
 22 displaying the thin portal service content on the local computer.

23 DESCRIPTION OF THE DRAWINGS

24 FIGURE 1 is an overall diagram of a network system in which
 25 the present invention can be implemented;

FIG. 2 is an architectural diagram of a preferred implementation of the local computer and the thin portal service;

FIG. 3 is an architectural diagram of a second implementation of the local computer and the thin portal service;

FIG. 4 is an architectural diagram of a third implementation of the local computer and the thin portal service;

FIG. 5 is an architectural diagram of a fourth implementation of the local computer and the thin portal service; and,

FIG. 6 is a flowchart illustrating the preferred functionality of the thin portal method of the present invention.

GLOSSARY OF TERMS AND ACRONYMS

The following terms and acronyms are used throughout the detailed description:

Client-Server. A model of interaction in a distributed system in which a program at one site sends a request to a program at another site and waits for a response. The requesting program is called the "client," and the program which responds to the request is called the "server." In the context of the World Wide Web (discussed below), the client is a "Web browser" (or simply "browser") which runs on the computer of a user; the program which responds to browser requests by serving Web pages, or other types of Web content, is commonly referred to as a "Web server."

Composition store. Composition store refers to a network service or a storage device for storing imaging composition(s) that can be accessed by the user or other web services.

Content. A set of executable instructions that is served by a server to a client and that is intended to be executed by the client so as to

1 provide the client with certain functionality. Web content refers to content that
2 is meant to be executed by operation of a Web browser. Web content,
3 therefore, may non-exhaustively include one or more of the following: HTML
4 code, SGML code, XML code, XSL code, CSS code, Java applet, JavaScript
5 and C-"Sharp" code.

6 Exchange infrastructure. An exchange infrastructure is a
7 collection of services distributed throughout a network that stores imaging data
8 associated with a particular user through a user profile.

9 HTML (HyperText Markup Language). A standard coding
10 convention and set of codes for attaching presentation and linking attributes to
11 informational content within documents. (HTML 2.0 is currently the primary
12 standard used for generating Web documents.) During a document authoring
13 stage, the HTML codes (referred to as "tags") are embedded within the
14 informational content of the document. When the Web document (or HTML
15 document) is subsequently transferred from a Web server to a browser, the
16 codes are interpreted by the browser and used to display the document.
17 Additionally in specifying how the Web browser is to display the document,
18 HTML tags can be used to create links to other Web documents (commonly
19 referred to as "hyperlinks"). For more information on HTML, see Ian S.
20 Graham, The HTML Source Book, John Wiley and Sons, Inc., 1995 (ISBN
21 0471-11894-4).

22 HTTP (HyperText Transport Protocol). The standard World
23 Wide Web client-server protocol used for the exchange of information (such as
24 HTML documents, and client requests for such documents) between a browser
25 and a Web server. HTTP includes a number of different types of messages
26 which can be sent from the client to the server to request different types of
27 server actions. For example, a "GET" message, which has the format GET

1 <URL>, causes the server to return the document or file located at the specified
2 URL.

3 Hyperlink. A navigational link from one document to another,
4 from one portion (or component) of a document to another, or to a Web
5 resource, such as a Java applet. Typically, a hyperlink is displayed as a
6 highlighted word or phrase that can be selected by clicking on it using a mouse
7 to jump to the associated document or document portion or to retrieve a
8 particular resource.

9 Hypertext System. A computer-based informational system in
10 which documents (and possibly other types of data entities) are linked together
11 via hyperlinks to form a user-navigable "web."

12 Imaging composition. An imaging composition comprises links
13 to imaging data serviced as a single unit.

14 Imaging data. Imaging data refers to digital data capable of being
15 represented as two dimensional graphics, such as a Portable Document Format
16 ("PDF") file or a Joint Photographic Experts Group ("JPEG") file.

17 Imaging data store. Imaging data store refers to a network
18 service or a storage device for storing imaging data that can be accessed by the
19 user or other network services. The imaging data store preferably accepts the
20 imaging data in multiple standard file formats, and the imaging data is
21 converted into these file formats when necessary depending on the
22 implementation.

23 Internet. A collection of interconnected or disconnected networks
24 (public and/or private) that are linked together by a set of standard protocols
25 (such as TCP/IP and HTTP) to form a global, distributed network. (While this
26 term is intended to refer to what is now commonly known as the Internet, it is

1 also intended to encompass variations which may be made in the future,
2 including changes and additions to existing standard protocols.)

3 PDA (Personal Digital Assistant). A small hand-held computer
4 used to write notes, track appointments, email and web browser with generally
5 with far less storage capacity than a desktop computer.

6 Personal imaging repository. A personal imaging repository is a
7 conceptual term describing the exchange infrastructure used to exchange
8 imaging composition and imaging data with web services. Users are associated
9 with their imaging data through user profiles.

10 Thin Portal Service. A service, among other things, that finds the
11 services available over a network that the local computer had connected with,
12 which the links to these discovered available services are provided to the user.

13 URL (Uniform Resource Locator). A unique address which fully
14 specifies the location of a file or other resource on the Internet or a network.
15 The general format of a URL is protocol: //machine address:port/path/filename.

16 User Information. User information is identification and security
17 information used in accessing imaging composition(s) and imaging data
18 associated with a particular user profile. It is preferably accessed either
19 directly or indirectly through methods provided by an extension component
20 integrated into the web browser.

21 World Wide Web ("Web"). Used herein to refer generally to both
22 (i) a distributed collection of interlinked, user-viewable hypertext documents
23 (commonly referred to as Web documents or Web pages) that are accessible via
24 the Internet, and (ii) the client and server software components which provide
25 user access to such documents using standardized Internet protocols. Currently,
26 the primary standard protocol for allowing applications to locate and acquire
27 Web documents is HTTP, and the Web pages are encoded using HTML.

1 However, the terms "Web" and "World Wide Web" are intended to encompass
2 future markup languages and transport protocols which may be used in place of
3 (or in addition to) HTML and HTTP.

4 Web Site. A computer system that serves informational content
5 over a network using the standard protocols of the World Wide Web.
6 Typically, a Web site corresponds to a particular Internet domain name, such as
7 "HP.com," and includes the content associated with a particular organization.
8 As used herein, the term is generally intended to encompass both (i) the
9 hardware/software server components that serve the informational content over
10 the network, and (ii) the "back end" hardware/software components, including
11 any non-standard or specialized components, that interact with the server
12 components to perform services for Web site users. Importantly, a Web Site
13 can have additional functionality, for example, a Web site may have the ability
14 to print documents, scan documents, etc.

15 DETAILED DESCRIPTION

16 Broadly stated, the present invention is directed to an improved
17 system and method for providing links to services available to an operably
18 connected local computer over a network. The system and method provide a
19 way for a computer, once connected to a network, to find services that are
20 available over the network and display the discovered available service in a
21 web content to the user's browser. As a result, users can utilize services
22 available to the laptop computer once connected to the given network
23 environment.

24 An overall diagram of a network system in which the present
25 invention can be implemented is shown in FIG. 1 and indicated generally at 10.
26 Because there are numerous ways of implementing the network topology of the

1 present invention, the current preferred network system is just one way to
2 implement the present invention. As a result, it should be understood that other
3 network topologies are contemplated and are within the scope of the present
4 invention.

5 In the preferred embodiment, a local computer 12 operably
6 connected to a network/communication link 14 contains the typical
7 components of a general computer, such as an input interface 18 and a display
8 interface 20. In addition, the local computer 12 preferably further includes a
9 web browser 22, a thin portal service 24 and a personal imaging repository 26.
10 As it is well-known in the art, the web browser 22 is a browser for displaying
11 pages of a web content, such as web pages in Hypertext Markup Language
12 ("HTML") or Extensible Markup Language ("XML"). On the other hand, the
13 thin portal service 24, which is an important aspect of the present invention,
14 provides links to services available over a network once connection is
15 established by the local computer 12. In other words, once the local computer
16 12 connects with the network/communication link 14, the user can request the
17 thin portal service 24 to find the available services provided on the network,
18 and the links to the discovered available services are displayed to the user on
19 the web browser 22.

20 The personal imaging repository 26 includes a composition store
21 28 for storing imaging composition(s) 30 of the imaging data that are serviced
22 as a single unit and an imaging data store 32, i.e., digital memory, for storing
23 the imaging data 34. An imaging composition 30 preferably contains links to
24 the imaging data, which can be located at another web service's site. As a
25 result, the composition store 28 stores only the imaging compositions 30. The
26 imaging data store 32, on the other hand, is any imaging data store located on

1 any computer that contains the imaging data 34. More specifically, each web
2 service can have its own imaging data store 32 available to the public.

3 For example, at some previous time, a user may have printed an
4 article from a web service site, resulting in an imaging composition 30 being
5 created and stored in the user's composition store 28. The imaging composition
6 30 contains only the link to the imaging data 34 for this article stored on the
7 web service site 36. Consequently, the imaging data 34 for the article is not in
8 the imaging data store 32 located on the local computer 12. Rather, the
9 imaging data 34 is stored in the imaging data store 32 located on the web
10 service site 36. Of course, users will have an imaging data store 32 that
11 belongs to their user identification where they can store imaging data 34, which
12 is the imaging data store shown in the local computer 12. As a result, the term
13 "personal imaging repository" 26 is meant as a conceptual term for an
14 exchange infrastructure between the imaging data and the available web
15 services on the Internet. Similarly, the term "web" denotes millions of distinct
16 servers that comprise the web, but the web does not actually do anything itself.
17 In the present invention, the servers serving as the composition stores 28 and
18 the imaging data stores 32 are physical implementations of the personal
19 imaging repository as a concept.

20 As a result, the personal imaging repository 26 becomes the
21 exchange infrastructure for imaging data with the web services that are
22 available on the Internet. When the user requests web services for any of the
23 imaging data 34 stored in the personal imaging repository 26, the requested
24 web service is configured to access the imaging data indicated by the selected
25 imaging composition 30 stored in the personal imaging repository. Put
26 differently, only the selected imaging composition 30 will be serviced by the
27 requested web service.

1 It should be noted that the personal imaging repository 26 can
2 represent any type of data storage device. In fact, the data storage device 26
3 does not necessarily have to be located within the local computer 12. The
4 personal imaging repository 26 can be located, for example, on another storage
5 medium, which the local computer can access through alternative
6 communication links. Although it is currently preferred to include the personal
7 imaging repository 26 with the local computer 12, this would likely change as
8 bandwidth becomes faster and the popularity and storage capacity of the
9 personal digital assistant ("PDA") increases. These alternative implementations
10 are contemplated and should be considered within the scope of the present
11 invention.

12 As shown in the overall network system, the local computer 12 is
13 connected to multiple imaging sources 36 and imaging destinations 38 via a
14 network/communication link 14. In this implementation, the imaging source
15 36 provides an imaging source service 40 for accessing the personal imaging
16 repository 26, and the imaging destination 38 provides an imaging destination
17 service 42 for servicing the imaging data stored in the personal imaging
18 repository. More specifically, as an example, the imaging destination 38 can
19 be a copying service for printing and binding the printed pages of the imaging
20 data. It is contemplated that all kinds of services can be designed to be
21 implemented with the present invention.

22 An architectural diagram of a preferred embodiment of the
23 implementation of the local computer and the thin portal service is shown in
24 FIG. 2 and generally indicated as 50. Similarly, the preferred local computer
25 52 includes the typical components of a general computer, such as an input
26 interface 56 and a display interface 58. In the preferred implementation, the
27 local computer 52 preferably includes a web browser 60, a personal imaging

1 repository 62 and a thin portal service 64. In addition, the local computer 52
2 includes setting information 66 with the thin portal reference 68 (i.e., thin
3 portal configurations and settings).

4 When the thin portal service 64 is requested by the user, the thin
5 portal service, as identified by the thin portal reference 68, finds links to
6 services available to the local computer 52 connected to a specific network.
7 The thin portal reference 68 is useful for users in choosing their thin portal
8 service 64. After finding the available services, the thin portal service 64
9 returns a thin portal web content 70, including links to the discovered services,
10 to the local computer 12. The thin portal web content 70 is displayed on the
11 web browser 60 to the user. At this point, the user can direct their browsers to
12 access these available services.

13 The personal imaging repository 62 is associated with a particular
14 user through user information 72 that is preferably accessible using an
15 extension component 74 located on the web browser 60 of the local computer
16 52. The user information 72 contains information regarding the user's personal
17 imaging repository 62; more specifically, information relating to the
18 composition store 76 and the imaging data store 78 of the personal imaging
19 repository.

20 An architectural diagram of a second implementation of the local
21 computer and the thin portal service is shown in FIG. 3 and indicated generally
22 as 80. The local computer 82, in this implementation, contains some of the
23 same components as the previous preferred implementation, such as an input
24 interface 86, a display interface 88, a web browser 90 and a personal imaging
25 repository 92. An extension component 94, providing access to user
26 information 96, is similarly included with the web browser 90, and an
27 composition store 98 and an imaging data store 100 of the personal imaging

1 repository 92 are included in the local computer 82. However, as shown, the
2 thin portal service 102 is physically located outside the local computer 82.

3 In this implementation, the local computer 82 must connect to a
4 thin portal server 104 through a communication/network link 108 to utilize the
5 thin portal service 102. However, it is still preferred that the setting
6 information 110 with the thin portal reference 112 be stored on the local
7 computer 82. When the thin portal service 102 is requested, it finds the
8 services available to the local computer 82 connected to a particular network
9 and returns a thin portal web content 114 with links to the discovered services
10 to the user's browser 90.

11 A third implementation of the local computer and the thin portal
12 service is shown in FIG. 4, and indicated generally at 120. In this embodiment,
13 the local computer 122 includes the typical components of a general computer,
14 such as an input interface 126, and a display interface 128. In addition, the
15 local computer 122 includes a thin portal service 130 with the setting
16 information 132 used to access the thin portal references 134. Similarly, also
17 found inside the local computer 122 is a web browser 136 with an extension
18 component 138 containing the user information 140 relating to a personal
19 imaging repository 142. A thin portal web content 144 with links to the
20 discovered services is similarly returned to the browser 136 by the thin portal
21 service 130 once the available services have been found.

22 However, unlike the previous implementation, the personal
23 imaging repository 142 is linked only to the local computer 122. Although it is
24 shown that the personal imaging repository 142 connects to the local computer
25 122 through a store server 146 via a network connection 148, the personal
26 imaging repository 142 can also be a general data storage device (not shown).
27 The server 146 provides a composition store 150 and an imaging data store 152

1 of the personal imaging repository to a connected local computer 122 having
2 the user information 140 assigned to it.

3 A forth implementation of the local computer and the thin portal
4 service is shown in FIG. 5, and indicated generally at 160. The local computer
5 162 again includes the typical components of a general computer, such as an
6 input interface 166, and a display interface 168. Furthermore, the local
7 computer 162 similarly includes a web browser 170 with an extension
8 component 172 including user information 174 relating to a personal imaging
9 repository 176. Additionally, setting information 178 including thin portal
10 references 180 relating to a thin portal service 182 is stored on the local
11 computer 162.

12 Both the personal imaging repository 176 and the thin portal
13 service 182 are linked to the local computer 162 through a
14 network/communication link connection 184. As shown, the thin portal service
15 182 is provided through the use of a thin portal server 186, and similarly
16 returns a thin portal content 188 to the browser 170 once the available services
17 have been found. The personal imaging repository 176, which includes a
18 composition store 190 and an imaging data store 192, is similarly provided to
19 the local computer 162 through a store server 194. The present implementation
20 is more fitted for use with the local computer 162 that is a personal digital
21 assistant ("PDA") or a wireless internet phone device, which generally has very
22 limited memory storage. Because the personal imaging repository 176 and the
23 thin portal service 182 is located on another server 186, 194, minimal memory
24 storage is required on the local computer 162.

25 Turning to an important aspect of the present invention, a flow
26 chart of the preferred functionality of the thin portal method is shown in FIG. 6,
27 and indicated generally at 200. The thin portal method is generally initiated by

1 the browser of a local computer requesting web content from the thin portal
2 service (block 202). This request will cause the thin portal service to query the
3 network for information on the current environment of the local computer
4 (block 204). The thin portal service next determines the selected network
5 address(es) of the local computer (block 206), and after which, any Internet
6 communication is preferably determined. More specifically, whether the local
7 computer (block 208) and/or any web proxy service connected to the local
8 computer (block 210) can communicate with the public Internet. The local
9 area network is then preferably checked for any available service(s) (block
10 212), and the type of these available services, if any of them, are found (block
11 214). Lastly, the portal service determines if any peripheral device(s) is
12 directly connected to the local computer (block 216). After obtaining the links
13 to the available services to the local computer, the thin portal service creates a
14 thin portal web content based on the information obtained through the queries
15 (block 218) and provides the thin portal web content to the web browser of the
16 local computer. The thin portal web content will include a list of links to the
17 services available to the local computer. Users, as a result, can easily direct
18 their browser to freely utilize any of the listed services.

19 From the foregoing description, it should be understood that an
20 improved system and method for providing links to services available over a
21 network has been shown and described, which has many desirable attributes
22 and advantages. The system and method provides a way for a local computer,
23 once connected to a network, to find the available services that are available
24 over the network, and display links to the discovered available services in a
25 web content displayed by the user's browser. As a result, users can utilize
26 services available to the laptop computer once connected to the given network
27 environment

1 While various embodiments of the present invention have been
2 shown and described, it should be understood that other modifications,
3 substitutions and alternatives are apparent to one of ordinary skill in the art.
4 Such modifications, substitutions and alternatives can be made without
5 departing from the spirit and scope of the invention, which should be
6 determined from the appended claims.

7 Various features of the invention are set forth in the appended
8 claims.